ABSTRACT
The plants *Ipomoea carnea* and *Grewia asiatica* are ethnobotanically used in the treatment of various diseases including diabetes and heart diseases. Diabetes mellitus is a disease characterized by hyperglycaemia, and hyperlipidaemia which leads to an increased risk of atherosclerosis and other cardiovascular diseases. The leaves of *Ipomoea carnea* and *Grewia asiatica* was shade dried and powdered. It was subjected to extraction with water. The aqueous extracts of both leaves were administered orally at two different doses of 250mg/kg and 500mg/kg. In the present study the hypoglycaemic and antihyperglycemic property of *Ipomoea carnea* leaves and *Grewia asiatica* leaves was carried out in normal rats, and in streptozotocin (50mg/kg.i.p) induced diabetic rats. In addition, the plant extract was evaluated by oral glucose tolerance test (OGTT) model for their influence at different doses on blood glucose levels in normal rats fed with overload of glucose. Glibenclamide (10mg/kg p.o) was used as a reference drug for antihyperglycemic activity.

The interpretation of the results was done after subjecting the data obtained from various studies to statistical analysis which included one way ANOVA followed by post tests like Dunnet’t’. Oral administration of *Ipomoea carnea* leaves and *Grewia asiatica* leaves for 21 days significantly reduced blood glucose level in STZ induced diabetic rats.

Key words: Hyperglycaemia, Hyperlipidaemia, Streptozotocin, and Glibenclamide.
Plants have always been an exemplary source of drugs and many of the currently available drugs have been derived directly or indirectly from them. The ethnobotanical information reports that about 800 plants that may possess antidiabetic potential. Several such herbs have shown antidiabetic activity when assessed using presently available experimental techniques \[11\-16\]. The discovery of widely used hypoglycemic drugs, metformin came from the traditional approach of using Gollega officinalis \[17\]. Thus it shows that plants are potential source of antidiabetic drugs, but this fact was not gained enough momentum in the scientific community. The reasons may be many including lack of medicine over alternative medicine, alternative forms of medicine are not very well defined, and natural drugs may vary tremendously in content, quality and safely. Although oral hypoglycemic agents/insulin or the mainstay of treatment of diabetes and are effective in controlling hyperglycemic, they have prominent side effects and fail to significantly alter the course of diabetic complications. As the knowledge of heterogeneity after disorder there is a need to look for more efficacious agents with lesser side effects \[18\].

Plants have been used for health and medical purpose from several thousand of years. They are one of the rich sources of medicine since human civilization. Now a days a person prefers plant based medicines over synthetic medication for the treatment of different disease because of their safety and economy. Herbal medicines are particularly used by the traditional practiceners since the ancient time but they do not have scientific data. Hence considering the above mentioned points, we have selected one of the plant Ipomoea carnea belongs to the family convolvulaceae. After the through literature survey, it is clear that, only few scientific publications are available and since much less work has been done and no report is available regarding Ipomoea carnea leaves which made us to take up present investigation of this plant and report the antidiabetic effect of its different extracts.

**MATERIALS AND METHODS**

**Collection of plant materials:**
The plant Ipomoea carnea and Grewia asiatica is widely found throughout India. The leaves of Ipomoea carnea and Grewia asiatica were collected in January 2012 from Nandasan – Mehsana district. The plant herbarium specimen was identified and authenticated by Dr. K J bhatt, Botany department, Pramukh swami science college, Kadi, North Gujarat University.

**Preparation of extract:**
The leaves were dried in shade at room temperature. The dried leaves were coarsely powdered and extracted successively by using soxhlet apparatus. The extracts were then concentrated in a rotary evaporator and dried in an oven at temperature of 40°C to constant weights. The aqueous extracts were used for antidiabetic activity.

**Experimental animals:**
Albino wistar male rats of 150 – 200gm were used throughout the experiments. The animals were procured from TRC, Ghandhinagar. Before initiation of experiment, the rats were acclimatized for a period of seven days. Standard environmental conditions such as temperature (26± 2°C) relative humidity (45 – 55%) and 12 hrs dark / light cycle was maintained in the quarantine. All the animals were fed with the rodent pellet diet and water was allowed ad labium under strict hygienic conditions.

**Antidiabetic activity on diabetic rats:**

**Induction of diabetes:**
Streptozotocin has been widely used to induce type 2 diabetes in animal models especially rats and mice. It has been reported that STZ induce dose dependent diabetes administered either intravenously or intraperitoneally. The rats which have body weight 150 – 200 gm, were selected for the diabetogenic activity. The animals were deprived for food for 18 hours prior to administration of streptozotoin. Streptozotocin was given intraperitoneally 50 mg/kg body weight \[19\,20\,21\]. The streptozotocin solution was injected within 15 minutes of dissolution in a vehicle with 1ml of tuberculin syringe fitted with 26 number gauge needles. Diabetes was confirmed by the determination of fasting glucose concentration on the third day post administration of streptozotocin. After the seven day stabilization period the animals which have blood glucose level more than 250mg/dl they were selected for studies.

**Acute studies on normal rats** \[22\,23\]:
For acute study, normal rats were divided into six groups contained six rat in each group. The animals were deprived for food for 16 hours before the experiment, and water is allowed to them, but on the day of experiment water is withdrawn.

Group I – Received vehicle 5% tween 80 p.o.
Group II - Received standard drug 10mg/kg of Glibenclamide p.o.
Group III – Received 250mg/kg aqueous extract of Ipomoea carnea leaves p.o.
Group IV – Received 500mg/kg of aqueous extract Ipomoea carnea leaves p.o.
Group-V – Received 250mg/kg of aqueous extract Grewia asiatica leaves p.o.
Group-VI – Received 500mg/kg of aqueous extract Grewia asiatica leaves p.o.

Blood glucose level was determined at 0 hour i.e. before drug administration, 0.5, 1, 2, 4, 8, 12, 16 and 24 hours after drug administration. Blood was collected from tail vein by snipping tail with sharp razor. Blood glucose level were estimated by using an electronic Glucometer.\(^\text{24,25}\)

The percentage reduction in blood glucose levels at time ‘t’ was calculated by using the following equation.

\[
\% \text{ Blood sugar reduction at time } 't' = \frac{(A - B)}{A} \times 100
\]

Where; A = Initial blood glucose level before drug administration.
B = Blood glucose levels at time ‘t’ after the drug administration.

Comparison among all groups was performed by using ANOVA.

**Acute study on STZ induced diabetic rats:**

The diabetogenic rats, having blood glucose level more than 250 mg/dl they were selected for the study. The rats were deprived for food 18 hours before the experiment and water is allowed, but on the day of experiment water is withdrawn. Animals were divided into six groups, contained six rats in each group. The blood samples were withdrawn at interval of initial 0 (zero hour). 0.5, 1, 2, 4, 8, 12, 16 and 24 hours of administration of single dose and Blood glucose level were estimated by using an electronic Glucometer.\(^\text{24,25}\)

Rats were divided into following groups.

**Group I:** Normal control were given 5% tween 80 p.o.

**Group II:** treated orally with standard drug Glibenclamide (10mg/kg).

**Group III:** treated orally with aqueous extract of Ipomoea carnea leaves at the dose of 250 mg/kg.

**Group IV:** treated orally with aqueous extract of Ipomoea carnea leaves at the dose of 500 mg/kg.

**Group V:** treated orally with aqueous extract of Grewia asiatica leaves at the dose of 250 mg/kg.

**Group VI:** treated orally with aqueous extract of Grewia asiatica leaves at the dose of 500 mg/kg.

The percentage reduction in blood glucose levels at time ‘t’ was calculated by using the following equation.

\[
\% \text{ Blood sugar reduction at time } 't' = \frac{(A - B)}{A} \times 100
\]

Where; A = Initial blood glucose level before drug administration.
B = Blood glucose levels at time ‘t’ after the drug administration.

**Statistical analysis:**

Statistical analysis were performed with one way analysis of variance (ANOVA) followed by Dennett’s ‘t’ test.

**RESULTS AND DISCUSSION**

In the present study the Antidiabetic property of Ipomoea carnea leaves and Grewia asiatica leaves were carried out in normal rats, and in streptozotocin induced diabetic rats. The selection of doses of test drug is based upon previous research work carried out in both plant. Acute 24 hours study for antidiabetic effect of extract was carryout in normal rats, and in STZ induced diabetic rats respectively. The detailed results with the onset of action, duration of action, and maximum percentage of blood glucose reduction of aqueous extracts of Ipomoea carnea leaves and Grewia asiatica leaves at a dose of 250 mg/kg and 500 mg/kg in normal and diabetic rats are given in (Figure 1&2 ; Tables 1 to 4) and the peak effect of these extracts on the blood glucose levels in glucose over load rats are compared.

**Fig 1:** Percentage reduction in blood glucose level of Ipomoea carnea leaves and Grewia asiatica leaves extract in normal albino rats

**Figure 2:** Percentage reduction in blood glucose level of Ipomoea carnea leaves and Grewia asiatica leaves extract in STZ induced diabetic rats (Acute study)
CONCLUSION
From the acute study of antihyperglycemic activity was carried on normal and streptozotocin induced diabetic rats it can be concluded that the aqueous extracts has significantly reduced the blood glucose level in a dose dependant manner. From the results it is concluded that aqueous extracts significantly increased the glucose tolerance in normal rats. In this study, the aqueous leaves extracts of Ipomoea carnea and Grewia asiatica possessed potential antidiabetic activities in Streptozotocin-induced diabetic rats. Grewia asiatica was found to be a more potent antidiabetic agent than Ipomoea carnea to reduce the blood glucose levels in diabetic rats.

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REFERENCE